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| 09/556,952 | 04/21/2000 | Cherie R. Kagan | YOR9-2000 0186US1 | 6543 |

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| EXAMINER |
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LORENZO, JERRY A

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| ART UNIT | PAPER NUMBER |
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1734

DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/556,952

Applicant(s)

KAGAN ET AL.

Examiner

Jerry A. Lorengo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 30-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30 and 32 is/are allowed.
- 6) ☒ Claim(s) 1-13, 32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- ☐ Interview Summary (PTO-413) Paper No(s) _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

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DETAILED ACTION

(1)

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-13, 32 and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Independent claims 1, 32 and 33 disclose, in their respective preambles, "A method of forming a patterned film, *wherein said thin film is not a monolayer*, said method comprising:" (emphasis added). The emphasized language, however, constitutes subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure as originally filed contains no recitation that the thin film "is not a monolayer." This is a new matter rejection.

(2)

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-11 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,512,131 to Kumar et al.¹

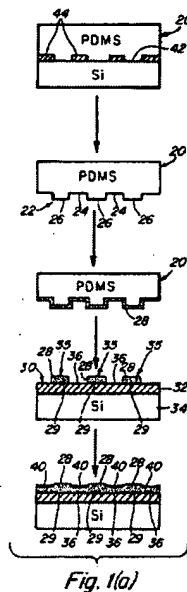
¹ Note to Applicant: Although this grounds of rejection, as well as those set forth in sections (3) and (4), does not take into account the preamble language disclosing "*wherein said thin film is not a monolayer*", the examiner respectfully submits that once the new matter described in section (1), above, is expunged from the claims, this grounds of rejection, and those set forth in sections (3) and (4), would continue to apply.

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Regarding applicant claims 1 and 33, Kumar et al. disclose a method of forming a patterned thin film comprising the steps of;

(1) providing a substrate 32,34 having a patterned layer of a self-assembled monolayer (SAM) 35 thereon; and

(2) depositing a thin film 40 thereover, which comprises, as per applicant claim 1, an organic molecule such as, for example, hexadecanethiol applied as a SAM, (Figure 1(a); column 5, lines 62-67; column 6, lines 1-14; and column 19, lines 1-18). The method of Kumar et al. is illustrated below:



Regarding applicant claim 2, Kumar et al. disclose that the substrate 32,34 may comprise metals, metal alloys, metal oxides, doped or undoped silicon, i.e., semiconductors, or polymers (column 10, lines 45-67; column 11, lines 1-8; column 14, lines 41-61).

Regarding applicant claim 4, Kumar et al. disclose that the substrate is a solid that may have a planar (as seen in Figure 1(a)) or any nonplanar surface exhibiting curves, corners, etc. (column 17, lines 18-21).

Regarding applicant claim 5, Kumar et al. disclose that the SAM pattern 35 disposed on the surface 30 of the substrate 32,34 may be provided by a stamping process comprising the steps of:

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(1) providing a stamp 20 having a patterned surface 22 (Figure 1(a); column 5, lines 62-67; column 6, line 1);

(2) coating the surface 22 of the stamp 20 with an organic molecular species 28 terminating in a first end (head functional group) capable of binding to the surface 30 of the substrate 32,34 and a second end (tail functional group) capable of interacting with the surface 22 of the stamp 20 (column 6, lines 1-3; column 10, lines 14-16; column 11, lines 23-27);

(3) placing the coated surface 22 of the stamp 20 in contact with the surface 30 of the substrate 32,34 for an amount of time to allow the first end functional group to bind thereto (Figure 1(a); column 6, lines 3-10); and

(4) removing the stamp to provide a SAM of the molecular species 28 on surface 30 of the substrate 32,34 (Figure 1(a); column 6, lines 10-14).

Regarding applicant claims 6-9, Kumar et al. disclose that the stamp is elastomeric (column 8, lines 35-38) having a surface exhibiting indented 24 and non-indented areas 26 (Figure 1(a); column 6, lines 29-32) which is capable of transferring the molecular species 28 to the surface 30 of the substrate 32,34 in a pattern defined by the topography of the stamp (Figure 1(a); column 6, lines 33-39).

Regarding applicant claim 9, Kumar et al. disclose that the first end (head) functional group may comprise thiols, sulfides and disulfides (column 11, lines 9-21).

Regarding applicant claim 10, Kumar et al. disclose that the second end (tail) functional group may comprise hydroxyl, hydrocarbon, halogenated hydrocarbon, carboxyl, etc. (column 11, lines 23-63)

Regarding applicant claim 11, Kumar et al. disclose that the molecular species 28 may comprise a hydrocarbon as well as halogenated hydrocarbons (column 12, lines 10-25).

(3)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,512,131 to Kumar et al.

Although Kumar et al., as set forth in section (2), above, disclose that the substrate is a solid that may have a planar (as seen in Figure 1(a)) or any nonplanar surface exhibiting curves, corners, etc. (column 17, lines 18-21), they do not specifically disclose, as per applicant claim 3, that the substrate is an irregularly shaped substrate.

Nonetheless, it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the method of Kumar et al. to pattern a substrate having an irregular shape motivated by the fact that Kumar et al. contemplates such nonplanar surfaces given his teaching that the stamp is advantageously chosen to be elastic, such that the stamping surface 26 may very closely conform to irregularities in a surface (column 7, lines 30-41).

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(4)

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,512,131 to Kumar et al. in view of U.S. Patent No. 6,020,047 to Everhart and U.S. Patent No. 5,059,258 to Wefers et al.

Kumar et al., as set forth in section (2), above, disclose a method for the formation of a patterned thin film on a substrate having a patterned SAM underlayer provided thereon through the use of patterned stamp. Although Kumar et al. disclose that the molecular species 28 may be based upon various phosphate species (column 11, lines 42-63), he does not specifically disclose, as per applicant claim 13, that the organic molecular species comprises octadecylphosphonic acid.

Wefers et al., however, also drawn to the formation of SAM of various phosphonic molecular species on substrates discloses that phosphonic species such as octadecylphosphonic acid are known for use in the formation of SAMs on oxidized metal substrates (Figure 1; column 4, line 6).

It would have been obvious to utilize phosphonic species, such as the octadecylphosphonic acid taught by Wefers et al., in the method of Kumar et al. motivated by the fact that Everhart, also drawn to methods for the deposition of a thin film material on a surface of a substrate having thereon a patterned underlayer of a SAM deposited through stamping (Figure 1) discloses that SAMs of phosphonic acid are useful in patterning metal or metal alloy coated substrates (column 3, lines 14-26).

(5)

Allowable Subject Matter

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 30 and 31 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Methods for the formation of a patterned thin film on a substrate having a patterned SAM underlayer provided thereon through the use of patterned stamp, such as taught by U.S. Patent Nos. 5,512,131 to Kumar et al. and 6,020,047 to Everhart, are known in the art.

Although it is also known, as suggested by Jeon et al. in "Patterning of dielectric oxide thin layers by microcontact printing of self-assembled monolayers", to utilize octyltrichlorosilanes as the organic molecular species for forming the SAMs, none of the prior art specifically teaches or suggests such a method wherein the organic molecular species for forming the SAMs specifically comprises (tridecafluoro-1,1,2,2-tetrahydrooctyl)trichlorosilane.

(6)

Response to Amendments and Arguments

The amendments and arguments filed September 10, 2003 are acknowledged. In response to the amendments to applicant claim 1 and the addition of new claims 32 and 33, a new matter rejection has been set forth in section (1), above.

Applicant's arguments filed September 10, 2003 have been fully considered but they are not persuasive. The applicant's primary argument is based upon the contention that the instant invention, as set forth in amended claims 1, 32 and 33, does not deposit a thin film comprising a monolayer, as opposed to that of Kumar et al., on a patterned underlayer of a self-assembled monolayer. The applicant argues that support for this contention, and for the amending of the preambles of claims 1, 32 and 33, can be found in Example 5 on page 30, lines 1-7 of the instant specification. That example discloses the deposition of a thin film of 50nm silica particles from a colloidal suspension. While the examiner respectfully agrees that such a film is not, in and of itself, a monolayer, the examiner also respectfully submits that such an example does not provide sufficient support for the amended preambles of claims 1, 32 and 33. Example 5 would only support a claim which deposits a thin film of 50nm silica particles from a colloidal suspension. As claims 1, 32 and 33 are not so limited, those claims with the amended preamble constitute new matter and have been rejected as such.

(7)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Applicant is encouraged to **FAX After Final Amendments** (37 CFR 1.116) to expedite delivery to the Examiner. The Group 1734 Facsimile number is **(703) 872-9306**. A duplicate mailed copy of the facsimile transmission is **not required** and will only serve to delay the processing of your application.

If the applicant prefers to mail in After Final correspondence it is highly recommended that such be mailed to **BOX AF** which will also facilitate processing from the mailroom and within Group 1700.

(8)

Drawings

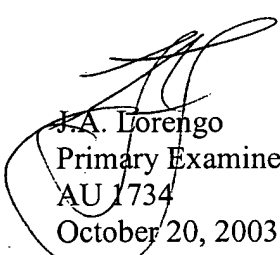
The drawings were received on September 10, 2003. These drawings are approved.

(9)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry A. Lorengo whose telephone number is (703) 306-9172. The examiner can normally be reached on Monday through Friday, 8:30 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (703) 308-3853. Please note that all patent application related correspondence transmitted by FAX must be directed to the central FAX number at 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


J.A. Lorengo
Primary Examiner
AU 1734
October 20, 2003